

The objections to the claims have been addressed by the claims amendments contained herein provided in accordance with the guidelines set forth in the Office Action. Accordingly, applicants respectfully request that this objection be withdrawn.

The rejection of claims 8 and 9 under 35 U.S.C. §112, first paragraph, is hereby traversed and reconsideration thereof is respectfully requested. The rejection states that the specification does not describe the use of either aluminum or an aluminum alloy, as recited in claim 8, as originally filed. Claim 9 is stated as being rejected as depending upon claim 8. Applicant respectfully submits that claim 9, as originally filed recited "*The reflection type liquid crystal display according to claim 8, wherein said aluminum alloy is an alloy of aluminum and neodymium*", which clearly discloses the recited aluminum alloy. Such an aluminum alloy was also recited in claim 9, as originally filed, and thus is part of the original disclosure. Further, support for aluminum and aluminum alloy may be found in the specification as originally filed at least at page 4, line 17; page 5, lines 20 and 23; page 8, line 15; page 10, line 5; page 16, line 4. Accordingly, applicants respectfully request that this objection be withdrawn. In addition, if necessary, Applicants would be willing to amend the specification by copying the subject matter of originally-presented claims 8 and 9 into the specification.

The rejection of claims 1-2, 4-6, 8, 12, 25 and 26 under 35 U.S.C. §103(a) as being unpatentable over Nagata et al (U.S Patent No. 6,118,505, hereinafter referred to as "Nagata") in view of Ukita et al (U.S Patent No. 5,940,154, hereinafter referred to as "Ukita") is hereby traversed and reconsideration thereof is respectfully requested.

Applicants respectfully submit that claims 1-2, 4-6, 8, 12, 25 and 26, as amended, are patentably distinct over the cited references, whether taken alone or in any combination.

Independent claim 1, as amended herein, recites a reflection type liquid crystal display having a pair of substrates disposed opposite to each other with a liquid crystal layer between them. There is a plurality of switching elements formed on one surface of at least one of the pair of substrates, and a reflective layer made of the same material as an electrode of the switching elements, and simultaneously formed during the formation of the electrode and switching elements on the same plane. A transparent pixel electrode is formed on the reflective layer on an insulation layer and is connected to at least one electrode of the switching element. Claims 2, 4-6, 8 and 12 depend directly or indirectly from independent claim 1, and recite further patentable features over the base claim.

Dependent claim 2, as amended herein, additionally recites that the switching elements may be a thin film transistor, and the reflective layer is formed of the same material as the gate electrode of the thin film transistor, and formed on the same plane as the gate electrode. Dependent claim 4 recites that a color filter layer is disposed between the reflective layer and the transparent pixel electrode. Dependent claim 5, as amended herein, recites that a shielding layer is disposed on an area of at least one switching element. Dependent claim 6 recites that the thin film transistor has a gate electrode electrically connected to a scanning line, a gate insulation film formed to cover the gate electrode, a semiconductor layer formed on the gate insulation film, a drain electrode electrically connected to a signal line, and a source electrode electrically connected to the transparent pixel electrode, and the reflective layer is electrically separated from the gate

electrode. Dependent claim 8 recites that the reflective layer is formed of aluminum or aluminum alloy. Dependent claim 12 recites that a rough portion is formed in the lower layer of the reflective layer, and the reflective layer is formed to cover the rough portion.

Independent claim 25 recites a reflection type liquid crystal display with a pair of substrates disposed opposite to each other via a liquid crystal layer, and a plurality of switching elements formed on one surface of the substrates. A reflective layer constituted of a same material as a material constituting the switching element is simultaneously formed during formation of the switching elements. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to one electrode of the switching element. The switching element is a thin film transistor, and the reflective layer is formed of the same material as the gate electrode of said thin film transistor and on the same plane as the gate electrode. There is a rough portion formed below the reflective layer, and covers the rough portion.

Independent claim 26 recites a reflection type liquid crystal display with a pair of substrates disposed opposite to each other via a liquid crystal layer, and a plurality of switching elements formed on one surface of the substrates. A reflective layer constituted of a same material as a material constituting the switching element is simultaneously formed during formation of the switching elements. A transparent pixel electrode is formed on the reflective layer via an insulation layer and connected to one electrode of the switching element. The thin film transistor has a gate electrode electrically connected to a scanning line, a gate insulation film formed to cover the gate electrode, a

semiconductor layer formed on the gate insulation film, a drain electrode electrically connected to a signal line, and a source electrode electrically connected to the transparent pixel electrode. The reflective layer is electrically separated from the gate electrode. A rough portion is formed below the reflective layer, and covers the rough portion.

The cited art of Nagata discloses a liquid crystal display device capable of having a black mask or color filter as the interlayer insulating film without lowering display quality. Thus, a simpler device may be made having fewer steps and lower cost. The type of transistor shown is what is known in the art as an inverted staggered transistor. As noted in the Office Action, the cited reference of Nagata does not teach the reflective layer of the present application being formed of the same material as the gate electrode. Applicants respectfully submit that Nagata teaches away from having the two layers formed simultaneously, as shown in the specification at least at column 4, line 52. Applicants further respectfully submit that Nagata teaches away from the above arrangement as being non-functional in the taught arrangement and therefore improperly cited as a reference in this application of a LCD device.

The cited art of Ukita discloses a reflection type liquid crystal display device which has a staggered type transistor. There is disclosed a reflection plate 2 shown in figure 3 as being located in a layer below the pixel electrode 6, and below the gate 9. The reflecting layer 2 is not formed at the same time as, nor made of the same material as any part of the switching elements, let alone the gate material.

Applicants respectfully submit that, in general, the cited references of Nagata and Ukita have different basic structures, specifically Nagata's transmission type cell with inverted staggered transistors, versus Ukita's reflection type cell with non inverted staggered transistors. There is no suggestion in either reference that the reflection type system of Ukita can be manufactured on the same manufacturing line as the transmission type system of Nagata, and thus obtain improved manufacturing efficiency. Thus, there is no apparent indication that if the combination were made, the resulting device would be operative. Furthermore, the suggestion in the Office Action that the rough surface of Ukita could be used in the device of Nagata to reduce light from entering Nagata's TFT is incorrect since the light in Nagata is coming through the top plate 42 and is prevented from hitting Nagata's TFT by the black layer 14. A reflective layer such as that suggested in the Office Action would completely render Nagata's arrangement inoperative.

Applicants further respectfully submit that there can be no motivation for one of ordinary skill to combine the cited references of Nagata and Ukita, since there is no suggestion that the reflection type system of Ukita having a reflection layer 2, could provide any type of benefit for the transmission type system of Nagata, which has no reflection layer.

Applicants further specifically submit that the cited combination of references does not contain, describe or suggest at least the combination of features of “... *a reflective layer constituted of a same material as a material constituting said switching element and simultaneously formed during formation of said switching elements; a*

transparent pixel electrode formed on said reflective layer via an insulation layer and connected to one electrode constituting said switching element ...”, as set forth in applicant’s independent claim 1, as amended herein. Rather, the suggested combination teaches away from the claimed arrangement, since the addition of a reflection layer to the Nagata reference would result in zero transmission, and thus an inoperative device.

Independent claims 25 and 26, as amended herein, also contain the same features discussed above, in particular the reflective layer formed simultaneously with the TFT, and the transparent electrode, and therefore the same arguments used above apply in their case as well.

For at least the above discussed reasons, applicants respectfully submits that independent claims 1, 25, 26 and thus claims 2, 4-6, 8, 12, which depend from independent claim 1, are patentable over the cited references, and respectfully requests that this rejection be withdrawn.

The rejection of claim 9 under 35 U.S.C. §103(a) as being unpatentable over Nagata in view of Ukita, and further in view of Seiki et al (U.S. patent No. 5,811,835, hereinafter referred to as “Seiki”) is hereby traversed and reconsideration thereof is respectfully requested. Applicants respectfully submit that claim 9 is patentable over the cited references, whether taken alone or in any combination.

Dependent claim 9 recites the reflection type liquid crystal display of claim 8, which depends from claim 1, where the aluminum alloy is an alloy of aluminum and neodymium.

The cited art of Nagata and Ukita are discussed above. The additional cited reference of Seiki discloses a liquid crystal display device in which the gate and signal lines, and the pixel electrodes formed of two conductive materials. The two materials include aluminum and chromium, tantalum, titanium and tungsten. There is no disclosure in Seiki of any thing similar to “... *a reflective layer constituted of a same material as an electrode of said... switching elements and simultaneously formed during formation of said electrode of ... switching elements... a transparent pixel electrode formed on said reflective layer via an insulation layer and connected to one electrode constituting said switching element ...*”, as set forth in applicant’s independent claim 1.

Applicants respectfully submit that the cited combination of references do not describe or suggest at least the combination of features of “... *a reflective layer constituted of a same material as an electrode of said switching element and simultaneously formed during formation of said electrode of said switching elements on a same plane ... a transparent pixel electrode formed on said reflective layer via an insulation layer and connected to one electrode constituting said switching element ...*”, as set forth in applicant’s independent claim 1, as amended herein. As discussed above, the suggested combination of references contains no disclosure relating to the simultaneous formation and identity of material. Therefore, since the cited references,

taken alone or in any combination, do not describe or suggest at least the above noted combination of features of the claimed invention, the cited references can not render independent claim 1 obvious, and therefore dependent claim 9 is felt to also be non obvious.

For at least the above discussed reasons, applicants respectfully submit that independent claim 1, and thus dependent claim 9, which depends indirectly from independent claim 1, is patentable over the combination of cited references, and respectfully requests that this rejection be withdrawn.

The rejection of claims 13 and 14 under 35 U.S.C. §103(a) as being unpatentable over Nagata in view of Ukita, and further in view of Kimura et al. (U.S. Patent No. 5,610,741, hereinafter referred to as “Kimura”) is hereby traversed and reconsideration thereof is respectfully requested. Applicants respectfully submit that claims 13 and 14 are patentable over the cited references, whether taken separately or in any combination.

Claim 13 recites a reflection type liquid crystal display according to claim 12, which depends from independent claim 1 where the rough portion is formed of a material which is not deformed in a heating process performed later and which does not contain high density impurities adversely affecting the liquid crystal display. Claim 14 also depends on claim 12, and recites the reflection type liquid crystal display where the rough portion is formed by forming an insulation film and patterning the insulation film.

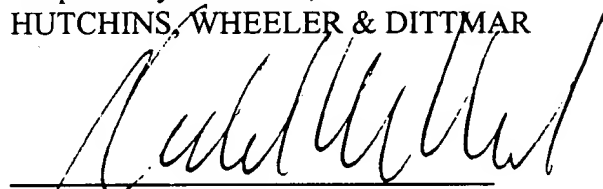
The cited references of Nagata and Ukita are discussed above. The cited reference of Kimura discloses a reflection type liquid crystal display device with a reflection portion that has a bumpy surface. The ratio of the surface area of the reflection layer to a smooth reflection layer is from 60% to 100%.

There is no disclosure in Kimura of any thing similar to “...*a reflective layer constituted of a same material as an electrode of said switching element and simultaneously formed during formation of said electrode of said switching elements on a same plane ... a transparent pixel electrode formed on said reflective layer via an insulation layer and connected to one electrode constituting said switching element...*”, as set forth in applicant’s independent claim 1, as amended herein.

As discussed above, the suggested combination of references contains no disclosure relating to the simultaneous formation and identity of materials used in the various portions of the TFT and the reflective layer. Therefore, since the cited references, whether taken alone or in any combination, do not describe or suggest at least the above noted combination of features of the claimed invention, the cited references can not render independent claim 1 obvious, and therefore dependent claims 13 and 14 are felt to also be non obvious at least as depending from an independent claim shown above to be non obvious over the suggested combination of cited references. Therefore, applicants respectfully request that the rejection of claims 13 and 14 be withdrawn.

Based on the above, applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-951-6676.

Respectfully submitted,
HUTCHINS, WHEELER & DITTMAR

A handwritten signature in black ink, appearing to read 'Donald W. Muirhead', is written over a horizontal line.

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Date: May 14, 2002

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